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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/817,843	03/26/2001	John U. Knickerbocker	END000008US1	9394

7590 05/05/2004
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EXAMINER

ANDUJAR, LEONARDO

ART UNIT PAPER NUMBER

2826

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/817,843

Applicant(s)

KNICKERBOCKER ET AL.

Examiner

Leonardo Andújar

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 17-21 and 35-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 17-21 and 35-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/24/2003 has been entered.

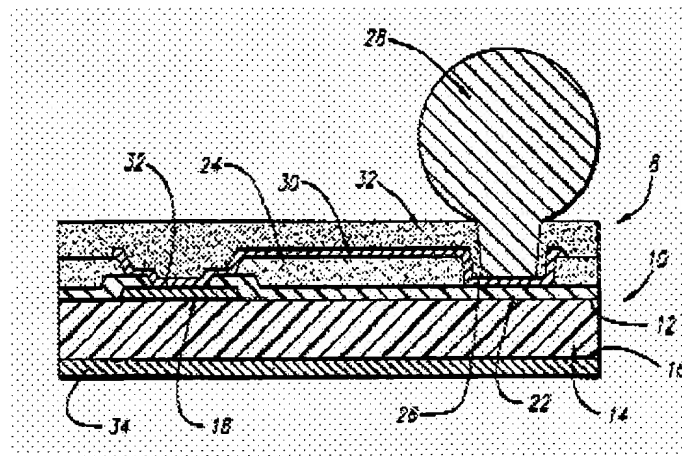
Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3 and 17-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Elenius et al. (US 6,441,487).

4. Regarding claim 1, Elenius (e.g. figs. 1 and 2) shows an electronic package comprising: a dielectric packaging substrate 22 having a major surface (top surface); and a conductive foil 30 having a smooth portion. The conductive foil is laminated with the substrate major surface. Also, the smooth portion contacts the major surface of the dielectric packaging substrate.



5. Regarding claim 2, Elenius discloses that the conductive foil may comprise aluminum, nickel or copper (col. 7/lls. 1-28).

6. Regarding claim 3, Elenius discloses that the conductive foil may comprise a high electrical conductivity material such as aluminum, nickel, titanium or copper (col. 7/lls. 1-28).

7. Regarding claim 17, Elenius (e.g. figs. 1 and 2) shows an electronic package comprising: a semiconductor packaging substrate 12 having a major surface; a first mechanically compliant dielectric layer 22 formed over the major surface of the substrate and having a at least one first opening formed therethrough; a first electrical contact pad 18 formed in the first opening and in electrical contact with the substrate; a second mechanically compliant dielectric layer 24 formed over the first compliant layer and having at least one second opening formed therethrough wherein the second opening is substantially offset from the first opening; a second electrical conductive pad 30 formed in the second opening and extending over a portion of the first electrical contact pad and contacting the first electrical contact pad; a mask layer 32 formed over the second compliant layer and having a third opening therethrough in communication

with the second electrical contact pad; and a solder ball 28 solderably connected to the second electrical contact pad and extending through the third opening.

8. Regarding claim 18, Elenius shows that the mask is a solder mask.

9. Regarding claim 19, Elenius shows that the compliant layers can be made of benzocyclobutene. Benzocyclobutene is a photoresist material (e.g. US 6,361,926, col.1/lls. 56-59).

10. Regarding claim 20 and 21, Elenius discloses that the contact pads may comprise aluminum, nickel or copper (col. 7/lls. 1-28).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 35-37 are rejected under 35 U.S.C. 103(a) as being obvious over Elenius et al. (US 6,441,487) in view of Gotoh et al. (US 6,204,454).

14. Regarding claims 35 and 36, Elenius shows most aspects of the instant invention including a contact pad laminated surface adhesion. However, Elenius does not disclose the specific roughness of the conductive surface. Gotoh discloses a conductive foil having a roughness in a range of 0.3 to 0.5 microns (col. 7/lls. 9-11). Gotoh discloses that this type of embodiment improves the electrical connection stability (col. 5/lls. 34-41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make conductive surface disclosed by Elenius having a roughness in a range of 0.3-0.5 microns in order to improve the electrical connection stability as suggested by Gotoh.

15. Regarding claim 36, Elenius in view of Gotoh does not disclose that the roughness is less than 0.01 microns. However, the specific roughness claimed by applicant, i.e., less than 0.01 microns, absent any criticality, is only considered to be the "optimum" roughness value of the conductive surface disclosed by the Prior Art that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, manufacturing costs, etc. (see *In re Boesch*, 205 USPQ 215 (CCPA 1980)), and since neither non-obvious nor unexpected results, i.e., results which are different in kind and not in degree from the results of the prior art, will be obtained as long as an opening in the housing is used as already suggested by the Prior Art. Note that Gotoh suggest that the surface roughness is a variable that can be subjected to optimization (cols 4-7).

Response to Arguments

16. Applicant's arguments filed on 02/18/2004 have been fully considered but they are not persuasive.

17. Applicant argues the Examiner bases the rejection on two, mutually incompatible, definitions of the term substrate. Nonetheless, this should not be an issue since claims 1 and 17 are distinct and independent from each other (emphasis added). It is perfectly legitimate to provide different interpretations of the prior of art teachings as long as the basis for the claim rejection is consistent and in accordance with the generally accepted meaning. Note that term substrate is defined as an underlying support or layer¹. Therefore, each of the underlying support layers 14 and 22 can be recognized as a substrate.

18. Applicant argues that the definition set forth by the Examiner in the rejection of claim 1 is not consistent with Applicant's definition since the specification teaches a BGA that includes a substrate made of an electrically insulating material. However, it is respectfully noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Moreover, Elenius clearly discloses that the substrate 22 that is made of an electrically insulating material (col. 5/lls.10-13).

19. Applicant argues the definition of substrate set by the Examiner in Point 4 is not consistent with the definition of Examiner's point 7. Nevertheless, this should not be an issue because Points 4 and 7 address distinct and independent claims. Furthermore,

different interpretations were given to the term substrate in each of the independent claims because different types of substrates were claimed. Note that claim 1 recites “a **dielectric** packaging substrate” whereas claim 17 recites “as a **semiconductor** package substrate”. A dielectric substrate is not equivalent to a semiconductor substrate (emphasis added).

20. Applicant argues that Elenius does not show a dielectric packaging substrate because the dielectric substrate 22 disclosed by Elenius is a wafer passivation layer and not a packaging substrate. Although the applicant uses terms different to those of Elenius to label the claimed invention, this does not result in any structural difference between the claimed invention and the prior art. The use of different terminology to describe the plurality of elements that constitute an integrated circuit is just a writing style and the way in which a structural limitation is expressed does not affect the configuration of the described elements. It is respectfully noted that the term “packaging” does not imply specific structural limitations. Although Elenius does not explicitly use the term “packaging” a dielectric packaging substrate 22 is clearly depicted in figure 2. The dielectric substrate 22 is used as a packaging substrate for the redistribution layer 30, the passivation layer 32 and the solder bump connection 28. Note that arguments of counsel cannot take the place of factually supported objective evidence. See, e.g., *In re Huang*, 100 F.3d 135, 139-40, 40 USPQ2d 1685, 1689 (Fed. Cir. 1996); *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984). Furthermore, applicant did not provide any factually supported objective evidence to support his/her position that the term “packaging” excludes dielectric layers such as resists.

21. Applicant argues that Gotoh teach away from the invention. Nonetheless, Gotoh provide positive suggestions. For example, Gotoh discloses that this type of embodiment improves the electrical connection stability (col. 5/lis. 34-41). The fact that applicant has recognized another advantage (i.e. an adhesion reduction) which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST.

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24. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

25. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Field of Search	Date
U.S. Class / Subclass (es): 257/690, 691, 698 and 700	04/04
Other Documentation:	
Electronic Database(s): East (USPAT, US PGPUB, JPO, EPO, Derwent, IBM TDB)	04/04

Leonardo Andújar

Patent Examiner Art Unit 2826

LA

4/27/04

sub-strate

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sub-strate (sùb'strát') *noun*

1. The material or substance on which an enzyme acts.
2. *Biology.* A surface on which an organism grows or is attached.
3. An underlying layer; a substratum.

[From substratum.]ⁱ

sub·stra·tum

sub·stra·tum (sùb'strâ'tem, -strât'em) *noun*

plural **sub·stra·ta** (-strâ'te, -strât'e) or **sub·stra·tums**

1. **a.** An underlying layer. **b.** A layer of earth beneath the surface soil; subsoil.
2. A foundation or groundwork.
3. The material on which another material is coated or fabricated.
4. *Philosophy.* The characterless substance that supports attributes of reality.
5. *Biology.* A substrate.

[New Latin, from neuter of Latin *substrātus*, past participle of *substernere*, to lay under : *sub-*, *sub-* + *sternere*, to stretch, spread.]

— sub·stra'tive *adjective*ⁱ

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